

1 TITLE OF THE INVENTION:

2 REMOVING SMALL ITEMS FROM A CARTRIDGE BASED RESTRICTED
3 ACCESS DISPENSER SYSTEM

4 FIELD OF THE INVENTION

5 This application pertains to a restricted access small item dispensing system, which may
6 be accessed by coin receiver, bill insertion system, credit card reader, voice recognition system,
7 keypad or other secure mode in order to address a specific cartridge within a module, and the
8 process of accessing small items such as a key, coins, collectibles, etc. This application discloses
9 and claims subject matter disclosed in my earlier filed provisional application, Serial Number
10 60/256,262 filed December 19, 2000, and it is also a Continuation In Part of my pending
11 application Serial Number 09/960,643 filed December 19, 2001.

12 BACKGROUND OF THE INVENTION

13 The need for a secure dispensing system for small items such as keys, to permit access
14 to car pool vehicles, access to city owned bicycles for use in crowded city centers, access to self
15 service medicine chests for ambulatory patients at hospitals and other facilities; short messages
16 for tenants in multi-occupant suites, the storage of tokens for use by patrons in coin operated
17 machines such as copiers in public buildings such as libraries and country clerk offices; and the
18 ability to access other small items for specific users has been well documented. This invention
19 fills that need by providing a secure dispensing system that can be accessed by a plurality of
20 means, such as but not limited to a 10-key keypad; a coin or bill insertion system, a credit card
21 reader, off-site telephone keypad such as on a cell phone, or other secure access means such as
22 fingerprint or voice recognition or eye discernment means. Access may be limited to a single
23 individual, or a class of persons depending upon the access code or access mode to be utilized
24 to gain entrance to a cartridge.

25 The invention herein consists of a series of individually accessible cartridges placed
26 within a module. Here five cartridges are utilized but this is not a limiting number. Each module
27 of five cartridges is disposed within a box that holds a plurality of modules and a plurality of
28 boxes can be housed in a cabinet. The storage area of each cartridge is designated the chamber.

29 The invention accordingly comprises the process and the sequence of steps which are
30 exemplified in the following detailed disclosure and the scope of the application of which will
31 be indicated in the appended claims. For a fuller understanding of the nature and objects of the
32 invention reference should be made to the following detailed description, taken in conjunction
33 with the accompanying drawings.

BRIEF DESCRIPTION OF THE FIGURES

FIGURE 1 is a front perspective of a single box with a multiplicity of cartridges within their respective cartridge housings.

FIGURE 2 is a perspective view of a storage cabinet housing a series of boxes of a plurality of modules forming a part of this invention.

FIGURE 3 is a front perspective view of one module of this invention.

FIGURE 4 is a rear to perspective view of one module of this invention.

FIGURE 5 is a front elevational closeup view of one partially filled module of this invention.

FIGURE 6 is a bottom perspective view of the module of this invention.

FIGURE 7 is a top perspective view of a pair of cartridges according to this invention, wherein the left one adjacent the pen shown for size only and not related to the invention, is a rear perspective view, and the cartridge distant from the pen is a front perspective view.

FIGURE 8 is a side perspective view of an individual cartridge employed with this invention.

FIGURE 9 is a side sectional view through a module of this invention illustrating an individual cartridge and its release mechanism's components.

FIGURE 10 is a diagrammatic view of the procedure to use the system of this invention to access stored small parts.

FIGURE 11 is a diagrammatic view illustrating a plurality of ways of accessing the storage cabinet that holds a plurality of the modules of this invention.

FIGURE 12 is an electrical schematic diagram of the circuitry involved for the operation of the access system of this invention.

FIGURE 13 is a perspective view of one type of keypad forming a part of this invention.

SUMMARY OF THE INVENTION

There is provided a secure access small item dispensing system that employs a plurality of cartridges each of which cartridges is capable of holding a small item to which access is to be limited to one person or a class of persons all of whom possess the access code or access mode, to cause the dispenser to release the cartridge from its holder for access to the contents. The apparatus comprising a storage cabinet having a plurality of boxes laid out in rows or columns, each of which boxes has a plurality of modules, each of which modules holds a plurality of cartridges therein.

The system uses any of several electronic signal inputs to actuate a release mechanism to cause the cartridge to be ejected from its module for access to the contents. Upon entry of the access code -E.G.- specific numbers on a keypad, or by use of the access mode, E.G. coin or bill insertion operation, an energized solenoid releases a latch that retains the cartridge in position within its housing in the module and a leaf or other spring urges it forward to be grabbed manually by the intended accessor. Upon insertion of the cartridge, or when returned into the slot, the physical force of urging the cartridge rearwardly, causes the cartridge to override a pawl of the latch pushing the pawl section downwardly, and a second leaf or other spring raises the pawl to its at rest position thus re-engaging the cartridge.

A plurality of secure procedures are recited for accessing the small articles that have been placed in one or more cartridges all of these procedures are related in that each procedure commences at an access point, which has the capability to initiate a signal to a selector to start the procedure.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A brief moment will be spent on the recital of the various aspects of this dispenser system for small parts. The invention herein consists at the lowest level of a series of individually accessible cartridges, of either plastic or metal, all of which are placed within a module. The number of cartridges may be arbitrarily chosen, but for illustrative purposes, five cartridges per module are depicted, but this is not a limiting number. A series of cartridge loaded modules is disposed within a box that holds a plurality of modules. These boxes may be oriented vertically or horizontally. A plurality of boxes can be housed in a cabinet. The storage area of the module that holds a single cartridge is designated as a cartridge receiver slot, and the storage area of an individual cartridge is designated the chamber.

In FIGURE 1 there is shown a conventional 6-sided box 100 having as the front surface a faceplate 101, and having a top surface 103. This faceplate 101 is attached to the sidewalls through threaded aperture 102 which receives screws 192S. These screws can be of the one way drive variety to impede vandalism. Top wall 103 has a series of spaced threaded apertures 109 for receipt of screws 109S, which screws matingly engage apertures not seen on the individual module to retain the module in the box 100. Seen exiting the rear wall (not seen) is a line cord 106 with a suitable connector 107 thereon for attachment to a common source of power for all of the modules. Construction of the box 100 is deemed conventional and can be of any tamper resistant material such as hardwood, metal or plastics such as polycarbonate. A cartridge specific identification means 56, discussed elsewhere, is seen in part.

FIGURE 2, is a perspective view, partially in cutaway at side opening 124 to illustrate the attachment of one box 100 to the sidewall 131 of cabinet 120 by flange plate 104. Other boxes 100 would be retained in the cabinet in like manner.

Designator 128 is an alphanumeric indicator for the identification of each separate cartridge in a module. By having such indicator system 56 carry light emitting capability, storage in-use condition can be readily seen by users of the system. Identification means 56 is electrically connected to access point 125.

As mentioned earlier, access to the system of this invention 200 can be had by an actuating means set in motion by an access code or access mode. One example of an access mode code input device would be by the use of voice recognition software to a computer not seen, stored either in the cabinet or offsite and linked electronically to the cabinet 200. An access code input would be by remote land line or cellular telephone to the same computer. Access mode examples are seen implemented into access point 125, an electronic device coupled to the cabinet 200, having several sources of monetary input which include a coin slot 121, a credit card or

1 debit card or other card, card reader 130 and a paper money receiver 129, said electronic device
2 being electrically connected to the plurality of modules and each individual cartridge therein.
3 Any of these can be used to access any cartridge similar to the accessing of a candy bar or
4 cookies from a vending machine, wherein the software programming permits access to the next
5 full cartridge. Or in the alternative, the money insert sources can be tied to the 10-key keypad 126
6 such that once money is credited, access can be had to a specific cartridge as opposed to a
7 random cartridge. As a third alternative, the keypad could be used alone, without resort to money
8 input. All of these modes of gaining access to a cartridge, be it specific or arbitrary are deemed
9 to be within the skill of the art.

10 *****

11 In FIGURE 3, the front of an individual module 10 is seen. This module 10 has a housing
12 12 with a top wall 11, a spaced bottom wall 13, spaced sidewalls 15 and 17 normal thereto, and
13 a series of spaced separator walls 16 to define each cartridge slot 19 within the confines of the
14 module. One cartridge slot 19 receives and retains one cartridge 22. Each separator wall 16 is
15 disposed in a pair of opposed slots 20. The series of solenoids 23 are seen in part in the view as
16 well. The front wall is open, but for the top and bottom walls each of which has elongated
17 recesses 20 aligned to receive separator walls 16.

18 In this FIGURE 3, the front wall of a cartridge is 66 while the chamber for storage is
19 designated 68, The balance of the construction of the cartridge will be discussed supra.

20 In FIGURE 4, a rear perspective view of the module of this invention, there is again seen
21 the top wall 11, the back wall 18 attached by small screws 26. This back wall 18 extends
22 downwardly but does not fully enclose the module at the rear thereof. The rear wall extends
23 downwardly from the top to a point short of interfering with the operation of the latch disposed
24 there beneath.

25 An inverted L-shaped mounting shelf 21 is secured to the back wall by small screws not
26 visible in this figure, but which can be seen in FIGURE 9. To which reference can be
27 simultaneously made. Since there are five cartridges, 5 solenoids 23 are seen linearly aligned.
28 Each solenoid includes an energizing terminal 24 to which is attached a pair of wires 39 and a
29 conventional connector 41. The ram housing 30 is secured into an opening 28 in solenoid mount
30 21 by a large screw 25. Bottom plate 37 which could be a circuit board for optional features, is
31 also attached by small screw 26 not seen. The module is spaced from the floor by a series of self
32 adhesive attached rubber feet 38, seen better in FIGURE 6.

33 A series of five pivot blocks 29 are spaced from each other and affixed to the bottom
34 wall 37. Each pivot block includes a latch spring, 31, to be described further supra, which

1 respective spring is retained in place by a large screw 25 that is engaged into an unseen threaded
2 opening in the respective pivot block. The pivot blocks are each attached to the bottom wall 37
3 by a pivot block mount screw 35.

4 The discussion moves now to FIGURE 5 which should be viewed in conjunction with
5 FIGURE 9. In FIGURE 5 the individual module 10 is seen. Each of the dividers 16 that form a
6 slot 19 for a cartridge 22, are retained in a channel 20 in the top and bottom walls. A stop 45,
7 which serves to also align the individual cartridge 22 is centrally disposed at the front end of each
8 slot 19.

9 Upon looking inwardly into an individual chamber 19, and by also referring to FIGURE
10 9, one can discern the tilted portion of the latch 33, at the bottom of the chamber, as well as one
11 of the two bolts 48 and its nut 49 that hold the ejection spring 47 of that particular chamber in
12 its place. The second such bolt and nut are not visible in FIGURE 5 due to their placement, but
13 see FIGURE 9 instead.

14 FIGURE 6 is a bottom slightly perspective view of the module of this invention. Here
15 it can be seen that lower bottom plate 37, which overlies bottom wall 13 is attached by small
16 screws 26, which screws could also be recessed in the manner shown for screws 26 that retain
17 the bottom wall 13, if the rear or lower bottom plate were thicker rather than being made of
18 circuit board material. The series of spaced rubber feet 38 which are preferably employed to raise
19 the module up and to provide clearance for large screws 25 are readily seen. These large screws
20 25, are preferably used with a lock washer 51 to retain the respective pivot block in position. The
21 wiring shown here has already been briefly described.

22 FIGURE 7 is divided into two sections, FIGURE 7A, which shows the rear and bottom
23 of a cartridge while FIGURE 7B is of the front and top of a cartridge 22. Pen 60 which forms no
24 part of this invention is shown for size information only. These cartridges may be clear,
25 translucent or opaque as may be desired. They are formed of two mirror image U-shaped,
26 preferably plastic sections 64, 65 which may be attached to each other as by adhesive or small
27 screws as is desired. The U-shape is seen from the top, per FIGURE 8. Each cartridge features
28 an open top wall 68, a recessed guide space 67, which is at the bottom, a rear wall 62 and a front
29 wall 66. A recess zone 63 adapted to receive the latch is found at the rear beneath the metal strip
30 67 which is retained by adhesive on said rear wall 62. Optional chip 70 or microcircuit 70 can
31 be employed for individual cartridge identification as may be desired using techniques known
32 to the art. Designator 69 is the open portion of the rear wall beneath and below the metal strip
33 61, that together with the recess zone 63 defines a latch receiver.

34 In FIGURE 8, a more perspective view of a single cartridge is seen. Here, one can better

1 view the guide space or raceway 67 and its adjacent recess zone 63. Each cartridge may vary
2 from ½" to about 1" wide and from about 2" to 4" in length.

3 In FIGURE 9, the relative positioning of the pivot block 29, the pivot pin 34 from which
4 the latch 33 pivots and the ram 27 which emanates from the solenoid 23 upon the energization
5 thereof are readily seen. Latch spring 31 keeps the latch horizontal until impacted by the moving
6 ram 27 whose force overcomes the spring's retention force, and thus moves the latch to the down
7 position as shown in this view. Housing is seen with one cartridge having been unlatched from
8 latch 33, and having been urged forwardly by spring 47 is seen partly out of the housing 12.

9 As noted earlier screw 25 retains the solenoid housing in the mount shelf 21. The guide
10 space 67 receives the alignment guide 45 shown elsewhere in the drawings.

11 When the latch is released from beneath the down hanging metal strip the compressed
12 ejection spring 47 urges the cartridge 22 forward to the position shown in this view. The latch
13 spring returns the latch to the first upright position. See arrow 74. Note the position of the stop
14 45 which both guides the cartridge and prevents rearward insertion past a certain point upon
15 return to the module.

16 From an operation perspective, when the accession also known as an actuating means or
17 the computer electronically connected to the accession means, determines which cartridge is to
18 be released from its module, a signal energizes the solenoid. The solenoid plunger momentarily
19 pushes down the latch, and releases the latch from engagement with the cartridge. The cartridge
20 is urged forward by the tension on a leaf spring disposed behind the cartridge. The ejection spring
21 being tensed, relaxes by urging the cartridge forward far enough out of the holder for the user to
22 grasp and remove the cartridge from the slot of the cartridge holder.

23 After the key, coins, stamps or other small item(s) is removed from the chamber of the
24 cartridge, it is urged back into its slot. The ejection spring 47 is compressed downwardly, and
25 the metal strip re-engages the latch.

26 When the solenoid is de-energized, the plunger returns inwardly, and the latch spring
27 then relaxes. Since the plunger has returned to its at rest position, the latch returns to the upward
28 at rest position.

29 When the cartridge, with the contents now removed, is reinserted into the holder, the
30 curved lower rear corner of the cartridge upon insertion rides the latch pawl down, such that the
31 pawl tip will be reinserted into the recess at the base of the cartridge whereby the cartridge is
32 retained in its respective slot for ultimate restocking prior to its next use. Though of course, the
33 contents could be used and replaced immediately into the cartridge prior to reinsertion of the
34 cartridge into the module. An example of such would be the accession to a key to open a strong

1 box. FIGURE 10 illustrates the procedure to be followed during the course of the use of the
2 dispenser of this invention. A user with a specific secure mode of access such as but not limited
3 to the modes shown in box 221, utilizes the mode to send an electronic signal to a cartridge
4 selector which is basically a computer to send a signal to release a specific selected cartridge,
5 per box 223.

6 The cartridge is released for removal per box 225. The cartridge is released in a manner
7 as is discussed elsewhere herein with respect to the discussion of FIGURE 9. The user removes
8 the small item contents of the cartridge, per box 227, and replaces the cartridge into its housing,
9 box 229. An optional light or other indicia can signal the previous accession of the cartridge 231.
10 The contents are now in the hands of the user, per box 233.

11 The logic to specifically select an individual cartridge or a next available cartridge are
12 both within the skill of the art. Thus, two types of logic are within the scope of this invention.
13 First, to sequentially select the next available filled cartridge within a module, when all of the
14 cartridges contain like filling material, such as a key to a room, a debit card for a photocopier,
15 etc. No true selectivity is defined. The analogy is to the taking of the next candy bar of the same
16 variety as the previous candy bar.

17 The other type of logic is to permit one to specifically select one special cartridge within
18 a module because it may have content that differs from the content of the next adjacent cartridge.

19 As shown in FIGURES 1 and 2, light-emitting diodes or LCD displays can be placed on
20 the faceplate and wired into the circuitry according to techniques known in the art. These
21 indicator means can be electronically connected to be lit up when contents are present and
22 dimmed upon content being removed. Such programmable logic is within the skill of the art.

23 It is also within the scope of the invention to program the logic such that a 10 key keypad
24 or other alphanumeric pad can specifically select a certain cartridge such as A4 or B5, similar to
25 the nomenclature shown on the faceplate currently. Such alphanumeric pads are known in the
26 art and are used today on stamp vending machines and certain large selection snack food vending
27 machines. Thus further details on how to incorporate such technology into the access point need
28 not be provided. Typical vendors include, PhilipsNV. and RCA. See FIGURE 13.

29 One item not discussed previously fully is faceplate, 101. This plate is the same as the
30 front wall 101 shown in FIGURE 1. The dashed lines, unnumbered thereon, are an indicator of
31 the bolt holes shown in FIGURE 1 for mounting the plate.

32 In the storage cabinet of FIGURE 2, it is seen that the cabinet includes a plurality of
33 boxes, each of which has a row of modules each of which contains a plurality of cartridges.
34 These cartridges are released from their respective holders by the utilization of any of the means

1 shown in FIGURE 11. All of these accession means offer a secure controlled access to either the
2 storage cabinet in general whereby the computer determines which cartridge is to be released,
3 or the accession means, be it code or mode, can be the manner in which the specifically
4 determined which cartridge is to be released. If the accession means is located at the site of the
5 cartridges, then the accession means can more easily specifically determine which cartridge is
6 to be released from its module. All such permutations are well within the skill of today's
7 computer programmer.

8 Reference is made once again to FIGURE 2 to be viewed in conjunction with FIGURE
9 11. Here in FIGURE 11 it is seen that keypad 126 and the other controlled access modes such
10 as the coin and bill receivers shown in FIGURE 2, and access modes connected electronically
11 such as computer keypad 131 and telephone keypad 132 all access the storage cabinet depicted
12 as box 120 for release of a cartridge and its contents.

13 The process to be utilized here can be made simple or complex, low priced or costly, as
14 may be desired. The ultimate cost of the device will depend on the nature of the access code or
15 access mode to be employed. Another cost factor will be the complexity of the logic. The
16 accession of a specific cartridge within a defined plurality of such cartridge is more costly than
17 merely selecting any cartridge. The latter is compared to the release of one candy bar from an
18 area that contains many of the same candy each one bar to be released.

19 It is seen that I have provided a safe and secure system for the accession of small items
20 that require secure confinement, the retrieval of which can be accomplished by various
21 procedures. Such items include keys, messages, coins, and the like.

22 Since certain changes may be made in the above described product and process without
23 departing from the scope of the invention herein involved. Certain changes can also be made in
24 the procedural steps of the process disclosed herein, without departing from the scope of the
25 invention. It is intended that all matter contained in the above description and shown in the
26 accompanying drawings shall be interpreted as illustrative and not in a limiting sense.